

Accepted Manuscript

Full Length Article

MnO@Al₂O₃ with high cycle performance via depressing solution of Mn for lithium-ion batteries anode

Inam Ullah, Youlong Xu, Xiaofei Sun, Wasif ur rehman, Yuan Zhang, Long Li

PII: S0169-4332(18)31803-8
DOI: <https://doi.org/10.1016/j.apsusc.2018.06.236>
Reference: APSUSC 39744

To appear in: *Applied Surface Science*

Received Date: 12 April 2018
Revised Date: 6 June 2018
Accepted Date: 25 June 2018

Please cite this article as: I. Ullah, Y. Xu, X. Sun, W. ur rehman, Y. Zhang, L. Li, MnO@Al₂O₃ with high cycle performance via depressing solution of Mn for lithium-ion batteries anode, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.06.236>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



MnO@Al₂O₃ with high cycle performance via depressing solution of Mn for lithium-ion batteries anode

Inam Ullah^{a,b}, Youlong Xu^{a,b}, Xiaofei Sun^a, Wasif ur rehman^a, Yuan Zhang^a, Long Li^a*

^a(Electronic Materials Research Laboratory, Key Laboratory of the Ministry of Education & International Center for Dielectric Research, Xi'an Jiaotong University, Xi'an 710049, China)

^b(Shaanxi Engineering Research Center of Advanced Energy Materials & Devices, Xi'an Jiaotong University, Xi'an 710049, China)

Abstract

The capacities fade of manganese oxide originating from the well-known Mn dissolution in electrolyte. Suppressing the dissolution of Mn elements can result in a significant enhancement of the cycling performance of anode materials. Surface coating of active material is one of the most effective strategies, especially; aluminum oxide is most widely adopted coating material to improve anode materials performance. Here we report, Al₂O₃ layer is coated on the surface and little Al-ions are diffused into MnO electrode prevents dissolution of manganese elements in electrolyte, decrease capacity fade and maintain structure stability of the active material. MnO@Al₂O₃ composite electrode delivers an initial discharging/charging capacities of 1390/822 mA h g⁻¹ at current rate of 100 mA g⁻¹ and maintains high reversible charging capacity of 855 mA h g⁻¹ after 100 cycles. Al₂O₃ coating prevents decomposition of manganese oxide in electrolyte and enhances the cycling stability.

Keywords: Al₂O₃ coating, MnO, anode material, cycling performance, Li-ion batteries

Download English Version:

<https://daneshyari.com/en/article/7833129>

Download Persian Version:

<https://daneshyari.com/article/7833129>

[Daneshyari.com](https://daneshyari.com)